

REMARKS

Claims 20-41 are pending in the application. Claims 20-23 have been rejected. Independent claim 24 has been allowed. Claims 20 and 22 have been amended to correct a minor grammatical error. No new matter has been entered. It is respectfully submitted that this Amendment is fully responsive to Office Action dated December 20, 2006.

Applicants thank the Examiner for allowing independent claim 24.

Specification

The Examiner objected to the specification for failing to state what the abbreviation for the letters "OHP" stand for. This abbreviation occurs on page 26, line 6 of the specification. The sentence states, "a mask having a rough shape of the electrodes was printed on an OHP sheet." The term "OHP sheet" means "transparency" which is a transparent sheet and is used for overhead projectors. Additionally, the specification has been amended to reflect this well-known definition.

On the Merits

Claims 20-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' admitted prior art and in view of *Nakayama et al.* (US Patent 6,892,432) and further in view of *Boggild* (US Publication 2002/0061662). This rejection is respectfully traversed.

"Nakayama" (US Patent 6,892,432)

As an introductory matter, the present invention is directed to "electrocrystallization." Namely, as indicated from line 21, page 19, "a solution (electrolyte) wherein a substance for forming molecular assembly is dissolved" is used to manufacture nano-wires.

On the contrary, *Nakayama* fails to disclose "electrocrystallization." *Nakayama* only discloses the method for arranging carbon nanotubes to manufacture a cartridge. At lines 35-47 of column 2, *Nakayama* discloses that **"an electrophoretic solution 20 that contains dispersed nanotubes is placed inside a hole in a glass substrate 21. ... This arrangement of the nanotubes can be confirmed by an electron microscope."** It indicates that there are dispersed nanotubes inside a glass substrate before direct-current is supplied to the electrode. Electric power is used only for arranging nanotubes not for obtaining nanowires from the electrolyte.

Independent Claim 20:

Regarding independent claim 20, the Examiner contends that in the Background Art section of the present specification on page 2, and also in *Moriyama et al.* (Japanese Patent JP-06-321686) and in *Muller* (US Patent 5,501,778), that together they disclose an apparatus producing an electrically conductive wire, which inherently comprises two electrodes with a gap in between them, and an electrolytic cell for holding an electrolyte and the two electrodes.

The Examiner contends that *Nakayama* discloses that it was well known to use two electrodes and a voltage control device for controlling the voltage applied across the two electrodes. See figures 11 and 12. The Examiner then states that *Nakayama* discloses the

electrolytic cell holds an electrophoretic solution 20 containing molecules that constitute an electrically conductive nano-wire (column 2, lines 35-39), and generate a gradient of voltage between the two electrodes by applying a voltage across the electrodes.

Nakayama appears to be directed towards a method of manufacturing a nano-tube cartridge. *Nakayama* appears to create carbon nano-tube probes for various types of microscopes. In the Background of the Invention Section, *Nakayama* discusses figures 11 and 12 which appear to show two electrodes (22) and (23) in contact with a electrophoretic solution (20) contained within a hole in glass substrate (21). The voltage across the electrodes is being controlled by a DC power supply (18).

However, this disclosure by *Nakayama* does not disclose an “electrically conductive nano-wire” as required by independent claim 20. *Nakayama* appears to be directed toward nano-tubes and does not mention whether or not the nano-tubes are electrically conductive. Additionally, in the Background of the Invention section on page 2 of the present application, it states that a “method of manufacturing a carbon nano-tube has also been known.” The present invention does not claim “nano-tubes,” but claims “nano-wires.” Therefore, the *Nakayama* reference does not disclose an “electrolytic apparatus for producing an electrically conductive nano-wire,” as required in claim 20.

Furthermore, claim 20 requires the electrolytic cell to hold an electrolyte containing molecules that constitute an electrically conductive nano-wire. *Nakayama* discloses an electrophoretic solution that contains dispersed nano-tubes. Column 2, lines 35, 36. *Nakayama* does not appear to disclose whether the nano-tubes are electrically conductive as required by the

claim. Applicants respectfully submit that the Examiner must provide support for the assertion that the nano-tubes contained in the electrophoretic solution are electrically conductive.

Regarding the requirement that the gap between the two electrodes be from 1 nm to 100µm, the Examiner uses *Boggild* to show this feature, specifically page 4, paragraph 59. In paragraph 59 *Boggild* discloses “the gap between the two manipulator means may be between 1nm and 20µm.”

However, *Boggild* appears to be an invention directed towards the fabrication and application of “nano-manipulators.” Abstract. In making a § 103 obviousness type rejection, the Examiner must show why a person having ordinary skill in the art would want to combine the references. In this case, the Examiner indicates that a person would want to combine the references, that is combine the electrolytic apparatus for producing an electrically conductive nano-wire to the nano-manipulator invention, “in order to manipulate nano-scale structure.”

Applicants respectfully submit that the Examiner’s rationale for combining the two references is not persuasive. The *Boggild* reference, which teaches nano-manipulators, is not pertinent to the claimed invention. It appears that the only reason the Examiner chose to use the *Boggild* reference was that it disclosed the required gap of 1nm to 100µm. Although both inventions are on a nano-scale, they are in completely different areas of invention. An electrolytic apparatus for producing a nano-wire is a completely different invention than an invention directed toward nano-manipulators.

As such, in light of the above mentioned arguments and rationale, Applicants respectfully submit the § 103 obviousness type rejection regarding independent claim 20 is improper and that the claim is presently in condition for allowance.

Dependent Claim 21:

As dependent claim 21 depends on independent claim 20, the arguments and rationale set forth above regarding claim 20 also apply to claim 21. As such, Applicants respectfully submit that claim 21 is presently in condition for allowance.

Independent Claim 22:

Independent claim 22 requires in part:

a substrate plug section for plugging the substrate,

the two electrodes have respective protrusions located either between both ends of each electrode and extending toward the other electrode, or on one end of each electrode and extending toward the other electrode by bending the each electrode at the one end....

In addition to the following arguments presented regarding independent claim 22, many of the arguments presented above regarding independent claim 20 also apply to claim 22.

The Examiner acknowledges that the substrate plug section of claim 22 is not prior art. However, the Examiner states that “it has been held to be within the general skill of a worker in the art to make reversal of parts as matter of obvious engineering choice, In re Gazda, 219 F.2d 449, 104 USPQ 400 (CCPA 1955).” The Examiner then continues and states that it would have

been obvious to include in the electrolytic cell a substrate plug section for plugging the substrate in order to easily assemble the electrolytic cell.

Applicants respectfully submit that the Examiner's cited case that reversing the order of parts constitutes obvious engineering choice, is not applicable. The Examiner has acknowledged that the substrate plug, as required by claim 22, is not disclosed. Therefore, there can be no choice of what order to assemble the electrolytic apparatus, as a constituent part has not been disclosed, the substrate plug. Applicants respectfully submit that the Examiner's the conclusion regarding the substrate plug, does not follow from the premise because a substrate plug is not disclosed or fairly suggested by any of the cited references.

Additionally as mentioned earlier, there is no motivation as to why a person having ordinary skill in the art would combine the *Boggild* reference with the prior art.

Dependent Claim 23:

Dependent claim 23 requires in part:

each end of the protrusions of the two facing electrodes faces each other in parallel, or is tapered as approaching the other protrusion; and the two electrodes have an insulated portion covered with an insulator; and

the site of the substrate plug section exposing the substrate when the substrate is plugged in the substrate plug section is covered with an insulator.

The Examiner contends that given the previous rationale in rejecting the other features of the electrolytic apparatus, the requirement that the two electrodes have an insulated portion covered with an insulator would be inherent because without such insulators on the substrate and

on the electrodes, the electrolytic apparatus could not generate a gradient of voltage between the two electrodes. Applicants respectfully disagree with the Examiner.

To establish inherency, the extrinsic evidence “must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). Thus, according to the Examiner’s own rationale, the insulators on the substrate and the electrodes must be present in order to create a gradient of voltage as required in independent claim 22.

The Examiner’s assertion does not appear to be true. Having an electrode covered with an insulating portion is not inherent to creating a gradient of voltage between the respective electrodes. The insulating portion, in part, helps to electrically isolate a gate electrode from the two electrodes. See figure 7. The insulating portion does not affect the voltage gradient between the two respective electrodes.

As such, Applicants respectfully submit that dependent claim 23 is presently in condition for allowance.

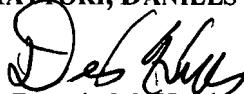
In view of the aforementioned amendments and accompanying remarks, Applicants submit that that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned agent to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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